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Attorney Docket No. : 20496-248

IN THE UNITED STATES PATENT & TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Group Art Unit : 1742
Examiner : Janell A. Combs-Morillo

Applicant	:	Rolf BODE, et al.
Serial No.	:	09/508,490
Filing Date	:	March 10, 2000
Title	:	PROCESS FOR THE PRODUCTION OF STOVE-FINISHED STRUCTURAL COMPONENTS FROM AGEING-SENSITIVE STEEL

APPEAL
BRIEF

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Alexander Migirov

Name of person signing the certification

Alexander Migirov May 1, 2002

Signature

Date

Assistant Commissioner for Patents
Washington, DC 20231

Sir:

This is an appeal from the final rejection of claims 1 and 3-5 in the Final Office Action dated October 18, 2001. For the reasons set forth below, it is requested that the rejection of these claims be reversed.

I. REAL PARTY IN INTEREST

All rights in the present application are assigned to Thyssen Krupp Stahl AG, a corporation organized under the laws of Germany and having a place of business at August-Thyssen-Strasse 1, 40211 Düsseldorf, Germany. Thyssen Krupp Stahl AG is the real party in interest.

II. RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences known to appellants, the appellants' legal representative, or the assignee which will directly affect, or be directly affected by, or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1-5 are pending in the present application.

Claim 2 has been found to be allowable over the prior art of record.

Claims 1 and 3-5 are being appealed.

IV. STATUS OF AMENDMENTS

An Amendment after Final Action under 37 C.F.R. 1.116(b) was filed on January 8, 2002. This Amendment was entered by the Examiner according to the Advisory Action dated February 11, 2002.

A Supplemental Amendment after Final Action under 37 C.F.R. 1.116(b) is being filed concurrently with this Appeal Brief. The Supplemental Amendment after Final amends independent claims 1 and 3 to overcome the rejection under 35 U.S.C. 112, second paragraph.

V. SUMMARY OF THE INVENTION

The present invention is a process for producing a buckling-resistant stove-finished structural component from a cold strip of ageing-sensitive steel with a high bake-hardening potential. According to one embodiment of the invention, the cold strip is converted by temper rolling to a yield point elongation-free state in which the condition $R_{ch} - R_{el} < 2 \text{ N/mm}^2$ is met. The cold strip is then stored at a storage temperature below room temperature for a storage period whose length is at most equal to the length of the period at whose end the value of critical ageing is reached which results in dependence on the particular storage temperature. This low-temperature storage enables the producer to store the steel strip much longer than under the storage conditions normally used for ageing-sensitive steel. Subsequently, the cold strip is cold worked to produce a structural component and the structural component is stove-finished. The stove-finishing uses the high-bake hardening potential of the inventive steel to produce strengthened and buckling-resistant components.

According to an alternative embodiment of the invention, the cold strip is first stored for a storage period at room temperature. After the storage period, the cold strip is

converted by temper rolling to a state in which the condition $R_{ch} - R_{cl} < 2 \text{ N/mm}^2$ is met.

The temper rolled cold strip is then cold worked to produce a structural component and the structural component is stove-finished.

VI. ISSUES

1) Whether the Examiner's rejection of claims 1-5 under 35 U.S.C. 112, second paragraph, for failing to have actively recited steps should be reversed.

2) Whether the Examiner's rejection of claims 1 and 3-5 under 35 U.S.C. 103(a) as being obvious over Stevenson (US Patent No. 4,358,325) should be reversed.

3) Whether the Examiner's rejection of claims 3 and 5 under 35 U.S.C. 103(a) as being obvious over Nakaoka et al. (US Patent No. 4,050,959) should be reversed.

VII. GROUPING OF CLAIMS

As to the rejection of claims 1-5 under 35 U.S.C. 112, second paragraph, it is Applicants' intention that the rejected claims do not stand and fall together. Claims 1 and 4 are separately patentable from claims 3 and 5.

As to the rejection of claims 1 and 3-5 under 35 U.S.C. 103(a) as being obvious over Stevenson (US Patent No. 4,358,325), it is Applicants' intention that the rejected

claims do not stand and fall together. Applicants submit that claims 1 and 4 are separately patentable from claims 3 and 5.

VIII. ARGUMENT

ISSUE #1

Claims 1-5 stand rejected under 35 U.S.C. 112, second paragraph, for failing to particularly point out and distinctly claim the invention. As stated in the Advisory Action dated February 11, 2002, method claims 1 and 3 must have actively recited steps. Accordingly, a Supplemental Amendment after Final Action under 37 C.F.R. 1.116(b) is being filed concurrently with this Appeal Brief which amends claims 1 and 3 to overcome the rejection thereto.

Accordingly, a reversal of the rejection under 35 U.S.C. 112, second paragraph, is respectfully requested.

ISSUE #2

Claims 1 and 3-5 stand rejected under 35 U.S.C. 103(a) as being obvious over Stevenson (US Patent No. 4,358,325), hereinafter referred to as "Stevenson". The Examiner asserts in the Final Office Action dated October 18, 2001, that Stevenson teaches a process for making a steel strip with improved formability comprising hot or cold rolling, cooling to a temperature below room temperature and forming as claimed in claim 1 of the present invention. The Examiner also asserts that Stevenson teaches that a

steel strip can be retained at room temperature for approximately a week prior to forming as claimed in claim 3 of the present invention.

The Examiner acknowledges that Stevenson does not teach bake hardenability of a strip that has been processed according to the present invention, but asserts that because Stevenson teaches substantially the same method as presently claimed, substantially the same results, i.e., bake hardening, would occur.

The rejection of claims 1 and 3-5 as being obvious under 35 U.S.C. 103(a) is in error since the reference fails to teach all claimed elements, and the subject claims would not have been obvious to one of ordinary skill in the art at the time of the invention based upon an understanding of the cited reference, as amplified below.

Stevenson teaches a method of heating and cooling a low carbon steel sheet below 0 °C to improve formability. See Column 1, lines 47-48. The low carbon steel is heated then quenched. The quenched steel is cooled to a temperature below room temperature, preferably 0 °C or lower. The process achieves an increased drawability before fracture compared to sheet steel formed at about 20 °C.

Applicants respectfully submit that Stevenson does not teach substantially the same method as the presently claimed invention and that one of ordinary skill in the art would not have been motivated to modify the teachings of Stevenson to arrive at the presently claimed invention.

It is a fundamental idea of the present invention, that up to further processing, the cold strip is stored so that the ageing process does not take place. In the embodiment of the invention as set forth in claim 1, the effect of ageing is delayed if the storage of the cold strip, age-sensitive after temper rolling, takes place at low temperatures. In this case, the storage period is determined by the "critical value of ageing resistance". See the specification, page 5, second paragraph, Table 3 and Fig. 2. The critical value of ageing resistance is the value at which the effect of the ageing of the cold strip becomes so great that there is no longer any yield point stress-free state for which the condition $R_{eh} - R_{el} < 2 \text{ N/mm}^2$ is still met. When this time is exceeded, there is no longer any yield point strain-free steel, so that its satisfactory further processing is no longer ensured.

According to the invention, as recited in claim 1, the cold strip is cold worked to produce the structural component before the end of the duration of storage is reached as determined by the critical value of ageing resistance. This ensures that working to produce the structural component can always be performed uninfluenced by the phenomenon of ageing, since the influence of ageing becomes noticeable only after the critical value of ageing resistance has been exceeded.

In contrast to the present invention, Stevenson does not disclose a maximum value for the condition $R_{eh} - R_{el}$. Nowhere does Stevenson disclose or suggest "converting the cold strip by temper rolling to a yield point elongation-free state in which the condition $R_{eh} - R_{el} < 2 \text{ N/mm}^2$ is met" as required by claim 1. Nowhere does

Stevenson disclose or suggest "converting the cold strip by temper rolling to a state in which the condition $R_{eh} - R_{el} < 2 \text{ N/mm}^2$ is met" as required by claim 3.

Furthermore, Stevenson does not disclose or suggest:

"storing the cold strip at storage temperature below room temperature for a storage period whose length is at most equal to the length of the period at whose end the value of critical ageing is reached which results in dependence on the particular storage temperature"

as required by claim 1. Indeed, Stevenson does not disclose or suggest the dependency between the temperature and storage time and the effect of these two parameters on ageing. In contrast, Stevenson teaches to produce a steel product in a conventional manner, to anneal this product in a furnace in order to adjust the amount of interstitial carbon. Stevenson then teaches to rapidly cool the product after annealing to a temperature below room temperature. Immediately after cooling, the product is formed in cooled dies in order to exploit the good formability of the low carbon steel in the deep cooled state. See Column 8, lines 24-39.

In addition, nowhere does Stevenson disclose or suggest "storing the cold strip undressed for a storage period" before temper rolling, as required by claim 3. In the present invention, the cold strip is stored before it is temper rolled thus avoiding the ageing process. Once the cold strip is converted by temper rolling, it is cold worked and stove-finished. Nowhere does Stevenson disclose or suggest this method as claimed in claim 3 of the present invention.

The prior art fails to teach or suggest all the claim limitations as properly required for establishing a *prima facie* case of obviousness. It would therefore not have been obvious for a person skilled in the art at the time of the invention to modify the teachings of Stevenson to arrive at the presently claimed invention.

Accordingly, a reversal of the rejection of claims 1 and 3-5 under 35 U.S.C. 103(a) is respectfully requested.

ISSUE #3

Claims 3 and 5 stand rejected under 35 U.S.C. 103(a) as being obvious over Nakaoka et al. (US Patent No. 4,050,959), hereinafter referred to as "Nakaoka". The Examiner asserts in the Final Office Action dated October 18, 2001, that Nakaoka teaches a method for producing a sheet from ageing sensitive steel with high formability at the forming stage, and high hardness at the coat-baking stage. The Examiner also asserts that Nakaoka teaches that a steel strip can be retained at room temperature for approximately a week prior to forming as claimed in claim 3 of the present invention.

The Examiner acknowledges that Nakaoka does not teach 1) that the forming step involves cold rolling or, 2) the difference in the upper and lower yield points $R_{eh} - R_{el} < 2$ N/mm². However, the Examiner asserts that because Nakaoka teaches substantially the same method as presently claimed, as well as a bake hardenability within the claimed range, that substantially the same results, i.e., difference in yield points, would occur and that Nakaoka renders the instant invention obvious.

The rejection of claim 3 as being obvious under 35 U.S.C. 103(a) is in error since the reference fails to teach all claimed elements, and since the subject claims would not have been obvious to one of ordinary skill in the art at the time of the invention based upon an understanding of the cited reference, as amplified below.

Nakaoka teaches a method for the production of a high strength cold reduced steel sheet having high bake-hardenability and excellent non-ageing properties. These properties are caused by the formation of the two phase structure of ferrite-martensite by water quenching in a jet stream from an intercritical temperature and the successive reheating - low temperature tempering. Column 3, lines 6-12. In order to achieve these properties, Nakaoka discloses strictly controlling the alloy of the steel in a very restricted range. Additionally, in order to form a two phase structure of ferrite-martensite, the steel has to be heated and cooled in two processes. Therefore, the process taught by Nakaoka is a restricted method of producing steel having the desired properties.

Applicants respectfully submit that one of ordinary skill in the art would not have been motivated to modify the teachings of Nakaoka to arrive at the present invention. Claim 3 is directed to a process for the production of a buckling-resistant stove-finished structural component from *ageing-sensitive* steel while preventing ageing of the steel. Nakaoka, on the other hand, teaches production of a *non-ageing* steel, and not the prevention of ageing of an ageing-sensitive steel.

It is not an object of the present invention to produce a steel resistant to ageing. Alternatively, the present invention provides a process for the production of a structural component from an ageing-sensitive steel, which endeavors to avoid the ageing process itself. This enables a steel to be processed which is still yield point stretch-free and therefore satisfactorily workable even after a prolonged storage period. See the specification, page 4, second paragraph, page 5, second paragraph, Table 3 and Fig. 2.

It is a fundamental idea of the present invention, that up to further processing, the cold strip is stored so that the ageing process does not take place. In the embodiment of the invention set forth in claim 3, the strip is stored in the undressed state, i.e., insensitive to ageing. The cold strip is dressed (temper rolled) immediately prior to working. Then, without any further storage, cold working is performed to give the structural component. In this case, the occurrence of ageing after the production of the structural component is prevented by the fact that the component is stove-finished. The "bake-hardening effect" triggered in this way reliably prevents the ageing of the steel worked to give the structural component. See the specification, page 3, paragraph 4.

Nowhere does Nakaoka disclose or suggest "storing the cold strip undressed for a storage period at room temperature" prior to temper rolling, as required by claim 3 of the present invention.

Thus, the prior art fails to teach or suggest all the claim limitations as properly required for establishing a *prima facie* case of obviousness. It would therefore not have

been obvious for a person skilled in the art at the time of the invention to modify the teachings of Stevenson to arrive at the presently claimed invention.

Accordingly, a reversal of the rejection of claims 3 and 5 under 35 U.S.C. 103(a) is respectfully requested.

IX. CONCLUSION

It is respectfully submitted that claims 1 and 3, as amended in the Supplemental Amendment after Final Action under 37 C.F.R. 1.116(b) and filed concurrently herewith, overcome the rejection under 35 U.S.C. 112, second paragraph.

It is requested that the rejection under 35 U.S.C. 112, second paragraphs, of claims 1-5 be reversed.

For the reasons set forth above, it is submitted that claim 1 is not rendered unpatentable by the prior art of record. Furthermore, as claim 4 depends from claim 1, it is submitted that it too is not rendered unpatentable by the prior art of record.

Also for the reasons set forth above, it is submitted that claim 3 is not rendered unpatentable by the prior art of record, regardless of the patentability of claim 1. Furthermore, as claim 5 depends from claim 3, it is submitted that it too is not rendered unpatentable by the prior art of record.

It is requested that the rejections under 35 U.S.C. 103(a) of claims 1 and 3-5 be reversed.

The Commissioner is hereby authorized to charge the fee for filing this Appeal Brief from Deposit Account No. 16-2500 of the undersigned.

The Commissioner is also hereby authorized to charge a one month Extension of Time Fee from Deposit Account No. 16-2500 of the undersigned.

Respectfully submitted,
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Date: May 1, 2002

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Enclosure: Appendix of Claims in Appeal



X. APPENDIX

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--1. A process for the production of a buckling resistant stove-finished structural component from a cold strip which comprises ageing-sensitive steel with a high bake-hardening potential, comprising the steps of:

- converting the cold strip by temper rolling to a yield point elongation-free state in which the condition $R_{eh} - R_{el} < 2 \text{ N/mm}^2$ is met,
- storing the cold strip at storage temperature below room temperature for a storage period whose length is at most equal to the length of the period at whose end the value of critical ageing is reached which results in dependence on the particular storage temperature,
- cold working the cold strip to give a structural component, and
- stove-finishing the structural component.

3. A process for the production of a buckling-resistant stove-finished structural component from a cold strip which comprises ageing-sensitive steel with a high bake-hardening potential, comprising the steps of:

- storing the cold strip undressed for a storage period at room temperature,
- converting the cold strip by temper rolling to a state in which the condition $R_{eh} - R_{el} < 2 \text{ N/mm}^2$ is met,
- cold working the temper rolled cold strip to give a structural component, and
- stove-finishing the structural component.

4. The process according to claim 1 wherein said bake-hardening potential is at least 70 N/mm².

5. The process according to claim 3 wherein said bake-hardening potential is at least 70 N/mm²...